

**SVKM's**  
**D. J. Sanghvi College of Engineering**

**Program: B.Tech in Mechanical Engineering**

**Academic Year: 2022**

**Duration: 3 hours**

**Date: 27.01.2023**

**Time: 09:00 am to 12:00 pm**

**Subject: Materials Technology (Semester III)**

**Marks: 75**

**Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.**

- (1) This question paper contains 2 pages.
- (2) **All Questions are Compulsory.**
- (3) All questions carry equal marks.
- (4) **Answer to each new question is to be started on a fresh page.**
- (5) **Figures in the brackets on the right indicate full marks.**
- (6) **Assume suitable data wherever required, but justify it.**
- (7) Draw the neat labelled diagrams, wherever necessary.

Question No.			Max. Marks
Q1	(a)	What are point defects? Illustrate with neat sketches the various types of point defects.	[8]
		<b>OR</b>	
		What is strain hardening? Explain the various stages of strain hardening in detail.	[8]
Q1	( b )	Derive the expression for Critical Resolved Shear Stress.	[7]
Q2	(a)	What is ductile-brittle transition? Explain Griffith's theory of brittle fracture.	[8]
		<b>OR</b>	
		Draw classical creep curve. Explain each stage in detail.	[8]
Q2	( b )	Write short note on: Fracture failure	[7]
Q3	(a)	Draw TTT curve for a eutectoid steel and explain the critical cooling curve.	[8]
		<b>OR</b>	
		Explain cooling of eutectoid steel from liquid state to room temperature with microstructures.	[8]
Q3	( b )	Draw the Fe-Fe <sub>3</sub> C diagram and label all the important temperatures, composition and phases in the diagram.	[7]
Q4	(a)	What are stainless steels? Give a brief classification of stainless steels. Discuss and mention their applications.	[8]
		<b>OR</b>	
			<u>[8]</u>

objectives

		Explain the <del>objects</del> , principle and applications of any one heat treatments process.	[08]
		objectives	
Q4	( b )	Explain the <del>objects</del> , principle and applications of any one surface heat treatment process.	[7]
Q5	(a)	Explain PMC MMC and CMC. Write their applications.	[8]
Q5	( b )	Write short note on: Smart materials. OR Write short note on: Nanotechnology	[7]